

CLAIMS

1. A lubricant composition comprising:

between about 40% and about 80% by volume of a film forming lubricant consisting essentially of unsaturated fatty acid(s) having between 16 and 26 carbon atoms and between one and three carboxylic acid moieties, or triglyceride(s) having from 16 to 26 carbon atoms and at least one double bond, or mixture thereof;

at least about 20% by weight of a suspension agent comprising:

a metal compound reactable with at least one carboxylic acid moiety in the unsaturated fatty acid, wherein the metal is a Group I metal, a Group II metal, or mixture thereof;

a film-forming amine $R_1-N-(R)_2$, where:

each R is independently an H or a C_2 to C_5 alkylene, and R_1 is a C_3 to C_{24} saturated or unsaturated aliphatic group or two saturated or unsaturated aliphatic groups with an oxygen therebetween, wherein the amine has between ten and thirty carbon atoms;

each R is independently an H, a C_2 to C_5 alkylene, or a C_1 to C_5 alkyl or alkanol, and R_1 contains between 10 and 24 carbon atoms and is a C_{10} to C_{24} mono- or poly-unsaturated hydrocarbon radical or a group R_2-O-R_3 ; wherein R_2 and R_3 are hydrocarbon moieties and at least one of R_2 and R_3 is a mono or poly-unsaturated hydrocarbon radical; or

mixtures thereof, wherein the amount of suspension agent is sufficient to provide at least a 50% overbased composition; and

between about 10 and about 50 pounds of polymeric beads per barrel of lubricant composition, wherein said lubricant composition is blended to form a substantially homogenous composition.

2. The lubricant composition of claim 1, wherein the lubricant composition comprises:

between about 50% and about 75% by volume of tall oil fatty acids;

between 20% and about 45% by weight of the suspension agent; and

between about 10 and about 35 pounds of the polymeric beads per barrel of lubricant composition.

3. The lubricant composition of claim 1, wherein the lubricant composition consists essentially of:

between about 50% and 80% by volume of tall oil fatty acids;

between 20% and about 45% by weight of the suspension agent, wherein the suspension agent comprises the metal compound, and wherein the metal is a Group I metal, a Group II metal, or mixture thereof; and

between about 10 and about 35 pounds of the polymeric beads per barrel of lubricant composition.

4. The lubricant composition of claim 1, wherein the lubricant composition comprises:

between about 60% and about 70% by volume of unsaturated fatty acid(s) having between about 18 and about 22 carbon atoms and between one and three carboxylic acid moieties;

between 30% and about 40% by weight of the suspension agent, wherein the suspension agent comprises the metal compound, and wherein the metal is a Group I metal, a Group II metal, or mixture thereof; and

between about 15 and about 20 pounds of the polymeric beads per barrel of lubricant composition.

5. The lubricant composition of claim 1, wherein the lubricant composition comprises:

between about 60% and about 70% by volume of tall oil fatty acids;

between 30% and about 40% by weight of the suspension agent, wherein the suspension agent comprises a metal base compound, and wherein the metal is a Group I metal, a Group II metal, or mixture thereof; and

between about 15 and about 20 pounds of a polymeric beads per barrel of lubricant composition.

6. The lubricant composition of claim 1, wherein the lubricant composition comprises:

between about 60% and about 70% by volume of the unsaturated fatty acid(s) having between about 16 and about 26 carbon atoms and between one and three carboxylic acid moieties, the triglyceride(s) having from about 16 to about 26 carbon atoms and at least one double bond, or mixture thereof;

between 30% and about 40% by weight of the suspension agent, wherein the suspension agent comprises the metal compound, and wherein the metal is a Group I metal, a Group II metal, or mixture thereof; and

between about 10 and about 35 pounds of a polymeric beads per barrel of lubricant composition.

7. The lubricant composition of claim 1, wherein the lubricant composition consists essentially of:

between about 60% and about 75% by volume of the unsaturated fatty acid(s) having between about 18 and about 22 carbon atoms and between one and three carboxylic acid moieties;

between 30% and about 40% by weight of the suspension agent, wherein the suspension agent comprises the metal compound, and wherein the metal is a Group I metal, a Group II metal, or mixture thereof; and

between about 15 and about 20 pounds of the polymeric beads per barrel of lubricant composition.

8. The lubricant composition of claim 1, wherein the film forming lubricant comprises at least 50% by weight of one or more tall oil fatty acids.

9. The lubricant composition of claim 1, wherein the suspension agent consists essentially of a metal salt, wherein the metal is sodium, potassium, and lithium, magnesium, calcium, barium, or mixture thereof.

10. The lubricant composition of claim 9, wherein the metal ratio is between about 2 and 12.

11. The lubricant composition of claim 1, wherein the polymeric beads have a size between 40 mesh to 100 mesh, the beads comprising a cross-linked polymer or copolymer of styrene, divinylbenzene, PVC/vinylacetate, vinylidene chloride/acrylonitrile, methylmethacrylate/ethylacrylate, or styrene/divinylbenzene.

12. The lubricant composition of claim 1, wherein the polymeric beads have a size between 60 mesh to 80 mesh, the beads comprising a cross-linked polymerized divinyl benzene, styrene, divinyl benzene/styrene, polystyrene crosslinked with divinyl benzene, or mixtures or combinations thereof.

13. The lubricant composition of claim 1, wherein the polymeric beads have a weight average particle diameter between about 220 and about 280 microns, with less than 30% by weight having a diameter less than 150 microns and less than 5% by weight having a diameter greater than about 350 microns.

14. The lubricant composition of claim 1, wherein the lubricant composition comprises less than about 2% by weight of each of:

promoters useful for forming the overbased film forming lubricant/suspension agent composition;

resin acids;

unsaponifiables; and

saturated fatty acids and their isomers.

15. The lubricant composition of claim 14, wherein the lubricant composition comprises less than about 5% by weight total of promoters useful for forming the overbased film forming lubricant/suspension agent composition, resin acids, unsaponifiables, and saturated fatty acids.

16. The lubricant composition of claim 1, wherein the lubricant composition comprises less than about 1% by weight of each of:

promoters useful for forming the overbased film forming lubricant/suspension agent composition;

resin acids;

unsaponifiables; and

saturated fatty acids and their isomers.

17. The lubricant composition of claim 1, further comprising between about 0.1% and about 5%, of inorganic particulate lubricant.

18. The lubricant composition of claim 17, wherein the inorganic particulate lubricant comprises graphite, molybdenum disulphide, lead oxide, or particles of aluminum, copper, lead, zinc, glass, or ceramic.
19. The lubricant composition of claim 17, wherein the inorganic particulate lubricant comprises graphite, molybdenum disulphide, glass, or ceramic.
20. The lubricant composition of claim 1, wherein the film forming lubricant comprises at least 50% by weight of unsaturated fatty acids having between 18 and about 20 carbon atoms.
21. The lubricant composition of claim 1, wherein the lubricant composition is substantially free of aromatics, cadmium, and lead.
22. The lubricant composition of claim 1, wherein at least half of the equivalents of the suspension agent are salts or bases of Group II metals.
23. The lubricant composition of claim 1, wherein at least half by weight of suspension agent is an alkaline earth metal base where the counter-ion is a hydroxyl, a carbonyl, a carbonate, or mixture thereof.
24. A method of lubricating a pipe in a wellbore, the method comprising:
adding between about 1% and about 5% by volume of the lubricant composition of claim 1 to a treating fluid; and
circulating the fluid containing the lubricant into the well to place the lubricant at the desired depth.
25. The method of claim 25, wherein the treating fluid is an aqueous-based drilling mud and the quantity of lubricant composition added is between about 2% and about 3% by volume.

26. The method of claim 25, wherein the treating fluid is an oil-based drilling mud and the quantity of lubricant composition added is between about 2% and about 3% by volume.

27. A lubricant composition comprising:

between about 50% and about 80% by volume of a film forming lubricant consisting essentially of unsaturated fatty acid(s) having between about 18 and about 24 carbon atoms and between one and three carboxylic acid moieties;

between 20% and about 45% by weight of a suspension agent comprising a metal salt or metal base reactable with at least one carboxylic acid moiety in the unsaturated fatty acid, wherein the metal is a Group I metal, a Group II metal, or mixture thereof, wherein the amount of suspension agent is sufficient to provide at least a 50% overbased composition; and

between about 10 and about 35 pounds of a polymeric particulate that functions as a mechanical lubricant per barrel of lubricant composition, wherein the polymeric particulate consists of polymeric beads having a size between 40 mesh to 100 mesh, the beads comprising a cross-linked polymer or copolymer of styrene, divinylbenzene, PVC/vinylacetate, vinylidene chloride/acrylonitrile, methylmethacrylate/ethylacrylate, or styrene/divinylbenzene; wherein said lubricant composition is blended to form a substantially homogenous composition.

28. The lubricant composition of claim 28, further comprising between 5% and 20% by weight of a film-forming amine $R_1-N-(R)_2$, where:

each R is independently an H or a C_2 to C_5 alkylene, and R_1 is a C_3 to C_{24} saturated or unsaturated aliphatic group or two saturated or unsaturated aliphatic groups with an oxygen therebetween, wherein the amine has between ten and thirty carbon atoms;

each R is independently an H, a C_2 to C_5 alkylene, or a C_1 to C_5 alkyl or alkanol, and R_1 contains between 10 and 24 carbon atoms and is a C_{10} to C_{24} mono- or poly-unsaturated hydrocarbon radical or a group R_2-O-R_3 ; wherein R_2 and R_3 are hydrocarbon moieties and at least one of R_2 and R_3 is a mono or poly-unsaturated hydrocarbon radical; or mixtures thereof.

29. The lubricant composition of claim 28 consisting essentially of

between about 50% and about 75% by volume of a film forming lubricant consisting essentially of unsaturated fatty acid(s) having between about 18 and about 24 carbon atoms and between one and three carboxylic acid moieties;

between 20% and about 45% by weight of a suspension agent comprising a metal salt or metal base reactable with at least one carboxylic acid moiety in the unsaturated fatty acid, wherein the metal is a Group I metal, a Group II metal, or mixture thereof, wherein the amount of suspension agent is sufficient to provide at least a 50% overbased composition; and

between about 15 and about 30 pounds of a polymeric particulate that functions as a mechanical lubricant per barrel of lubricant composition, wherein the polymeric particulate consists of polymeric beads having a size between 40 mesh to 100 mesh, the beads comprising a cross-linked polymer or copolymer of styrene, divinylbenzene, PVC/vinylacetate, vinylidene chloride/acrylonitrile, methylmethacrylate/ethylacrylate, or styrene/divinylbenzene; wherein said lubricant composition is blended to form a substantially homogenous composition.